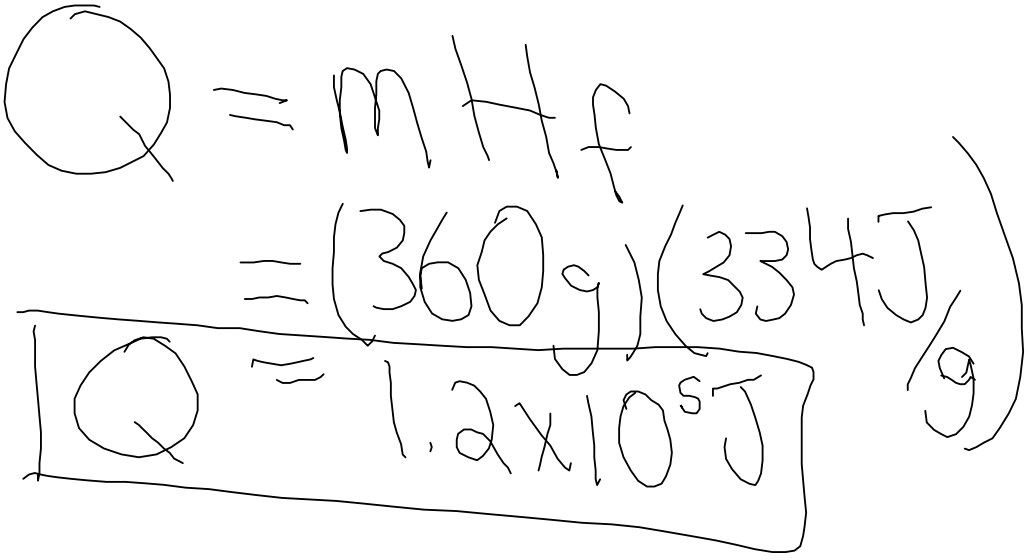
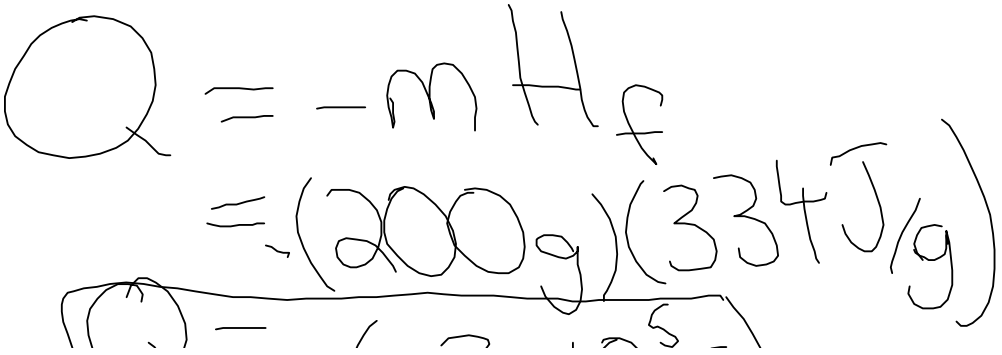
Heat of Fusion & Heat of Vaporization Calculations

1. How much heat is required to melt 360g of solid water? Hfusion of water is 334J/g



2. How much energy is released when 200g of water freeze? Hfusion = 334J/g



$Q = -6.7 \times 10^5 J$

Heating Curves

A 0.085kg sample of Mercury is heated from 25 ◦ C to 500 ◦ C.

a) Sketch the heating curve for the above process. Label Ti, Tf, BP, MP.

c(solid)=0.142kJ/kgC

MP=-39 ◦ C

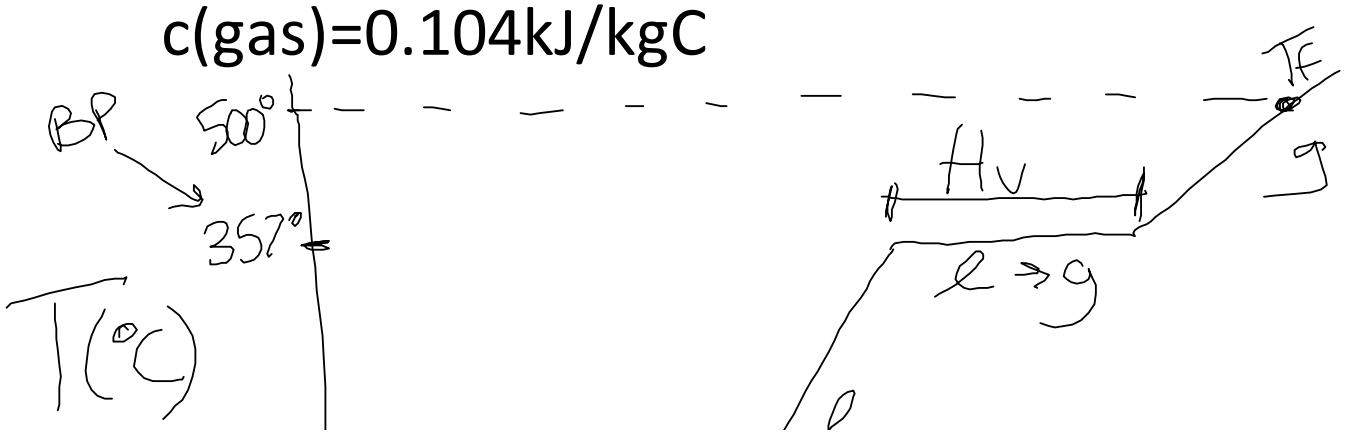
Hfus=11.3kJ/kg

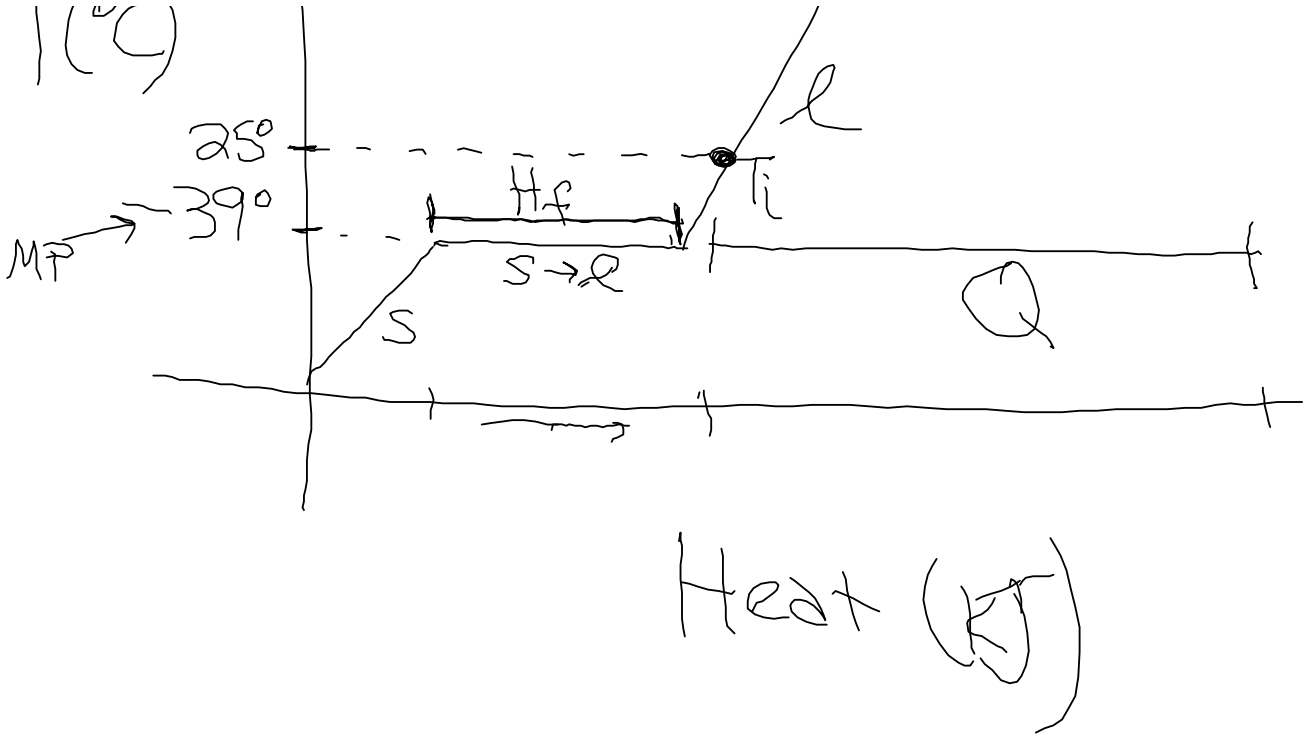
c(liquid)=0.140kJ/kgC

BP=357 ◦ C

Hvap=293kJ/kg

c(gas)=0.104kJ/kgC





b) Calculate the heat required for each step of the heating curve, and the total heat required.

25° → 357°

$Q = mc\Delta T$

$= (.085)(0.140\frac{kJ}{kg°C})(332)$

$= 3.95 kJ$

Hv

$Q = mH_v$

$= (.085)(293\frac{kJ}{kg})$

$Q = 24.9 kJ$

357° → 500°C

$357° \rightarrow 500°C$

$Q = mc\Delta T$

$= (.085)(0.104 \frac{KJ}{Kg°C})(143°)$

$Q = 1.26\,KJ$

$Q_T = 3.95 + 24.9 + 1.26$

$\boxed{Q_T = 30.1\,KJ}$